Algorithmic and High-Frequency Trading:
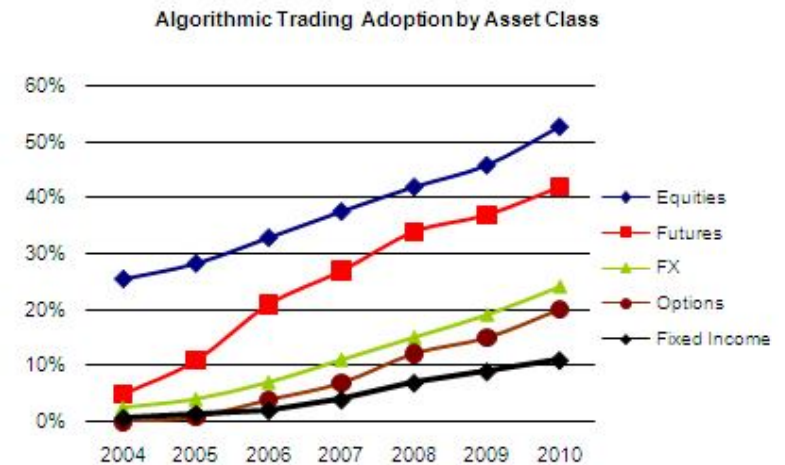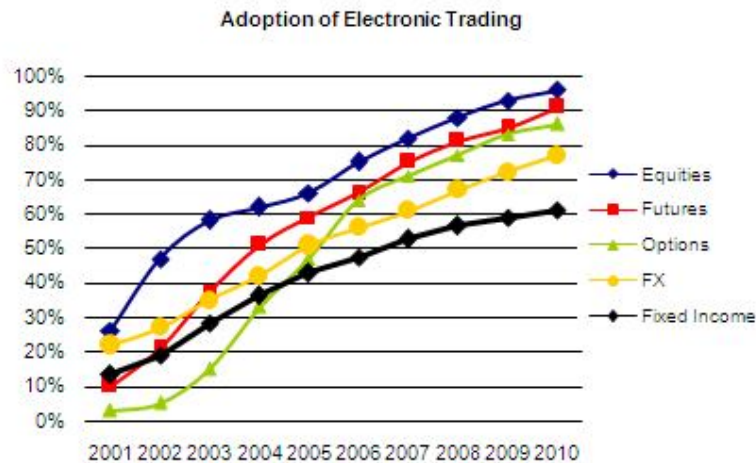
Why Now and How?

Electronic and Algorithmic Trading: Useful Statistics

Adoption of Electronic Trading

Algorithmic Trading Adoption by Asset Class

High Frequency Trading
      US: 3/4 of equity trading volume
      UK: 1/3 of equity trading volume

Source: AITE Group Research

Current Markets Landscape

1. Unification of Standards and Protocols

2. Regulatory Changes

3. Balanced Allocation Models

4. Multi-Asset Class OMS and EMS

5. Consolidation of Exchanges

6. Market Growth and Crisis Resilience

7. Alternative Electronic Venues and IOIs

8. Squeeze on Spreads and Lower Commissions

9. Pressure to Reduce Costs

10. Higher Opportunity Cost of Not Trading

11. Higher Level of Market Volatility

12. Information Leakage

13. Fierce Competition

14. Increasing Complexity of Trading

Today's Electronic Trading Reality

- Ability to trade across multiple products and dealers;

- Exposure to new market segments and participants;

- Universal real-time view of positions and transactions;

- Standardized trades;

- Simultaneous execution of multi-leg trades from various asset classes;

- Trade information transparency;

- Reuse of existing algorithms throughout multiple asset types;

- Asset allocations using new trading strategies;

- Ability to trade baskets, ETFs, strategies and indexes;

- Mutual market view: uniform framework for pricing and financial analysis;

- True STP – similar processing flow regardless of the asset class from the trading system down to middle office and back office.

Technical Challenges and Prerequisites

- Straight-Through Processing, Integration, Standardization, Common Processes, Common Components, FIX, Open Architecture and APIs

- Infrastructure and Connectivity, Messaging, Parallel Processing and Distribution of Multiple Data Streams

- Market Data Processing, Ticker Plants, Low-Latency Adapters, Financial Data Warehouse

- Technology/Process Outsourcing

New Trends

-Smart Order Routing and Direct Market Access

-Algorithmic Trading

-Transaction Cost Analysis

-Multi-Asset Class Algorithms

-Cross-Asset Class Trading

-Multi-Asset Class Real-Time Risk Management and Cross-Margining

-High-frequency Trading

-Sponsored Access

-Co-Location

-Unified Mechanism for Clearing and Settlement, Central Clearing Counterparties

-Technology-driven Matching

Technology Developments and Advances

- Automatic Processing of Market News

- Cloud Computing

- Many-Core Computing and Special Purpose Chips

- Dynamic and Adaptive Algorithms

Multi-Asset Class Algorithms and Cross-Asset Trading Solutions

Algorithmic trading (execution strategies)

- New Asset Allocation Models, Balanced Portfolios and Strategies

- Benchmarking

-Liquidity Sweepers

- Advanced Trading Technology

-Price/Trade Transparency and Distribution

-Tick-by-tick analysis

Quantitative analysis (alpha discovery)

-Modeling and Analytics (factor, statistical, technical and fundamental)

-Uneven and Multi-Leg Methodologies (e.g. Options)

- Arbitrage

-Competitive Advantage

-Back-testing and calibration

-News Handling

Algorithms:

- Execution Objective Algorithms

- Technical and Statistical Algorithms

- Auto-hedging Algorithms

- Index Arbitrage

- Cross-Exchange Arbitrage

- Decision Systems Algorithms

- Complex Event Processing

- Price-Based Algorithms

- Custom Trading Strategies

- "What-If" Analysis

- Transaction Cost Analysis Centric

Business Cases

1. **Standard Algorithms**
VWAP, TWAP, Participation, On-Close, Arrival Shortfall

2. **Custom Algorithms**
Dynamic VWAP, Liquidity Analyzer, Complex Event Processors, Gamma Weighted Average Price (GWAP)

3. **Arbitrage Strategies**
ADR/Local, Index, Pairs, Statistical

4. **Pricing/Valuations**
Black-Scholes, OAS, Forward/Swap/Zero-Coupon Yield Curves, ETFs, Implied Volatility/Stochastic Local Volatility, Baskets, complex and exotic derivatives

5. **Market Making** Real-time hedging of complex instruments, Spot/Futures Analysis, Liquidity scan of markets

6. **Risk Management** Market, Credit and Liquidity risk calculations (scores, VaR, stress testing, loss-given-default, etc.)

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New Electronic Trading Model

Tools Used

- FIX Protocol, FAST and STP;
- Real-time Pricing, Market Data and Benchmarks;
- Integration with Electronic Exchanges.

Opportunities Created

- Enhanced Product Packaging and Structuring (Baskets/Strategies/Funds/Structured Finance and Private Equity);
- Advanced Hedging (Grouping Derivatives with Underlying Securities);
- Improved Analytics (e.g. dynamic greeks calculations, comparing the gross price of a bond to its net present value in the swaps market, calculating default probabilities from current bond prices, etc.);
- Reduced asset exposure without additional trading expense;
- Better Valuation;
- Arbitrage;
- Consolidation/normalization of databases (customers, brokers, salespeople, trades);
- Easier Compliance and Autotrail;
- Cost Reduction;
- Improved Identity Management;
- Consolidated Risk Management and Reporting.

Bottom Line Advantage

- Competitiveness/Alpha/$$

Product Examples

1. **Muni Bonds, Treasury Futures, IRS;**
2. **Corporate Bonds, Stocks, CDS;**
3. **Individual stocks and index futures;**
4. **Emerging Market Bonds, Treasuries, Foreign Exchange;**
5. **Distressed Debt, Commodities Futures;**
6. **Mortgage-Backed Securities, on-the-run Treasuries;**
7. **Cash and Repos.**

What about Russia? The interest is there and growing.

-LSE's IOB: Russian DRs now account for 90% of the value traded on the IOB, up from 50% in 2004.

-Foreign and domestic electronic trading will climb to just over 10% by the end of 2011, compared to current levels of 3%.

-International asset management and high-frequency trading flow will grow to 25% of Russian equity trading by the end of 2011, from 10% in 2009.

Source: TABB Report

Putting It All Together